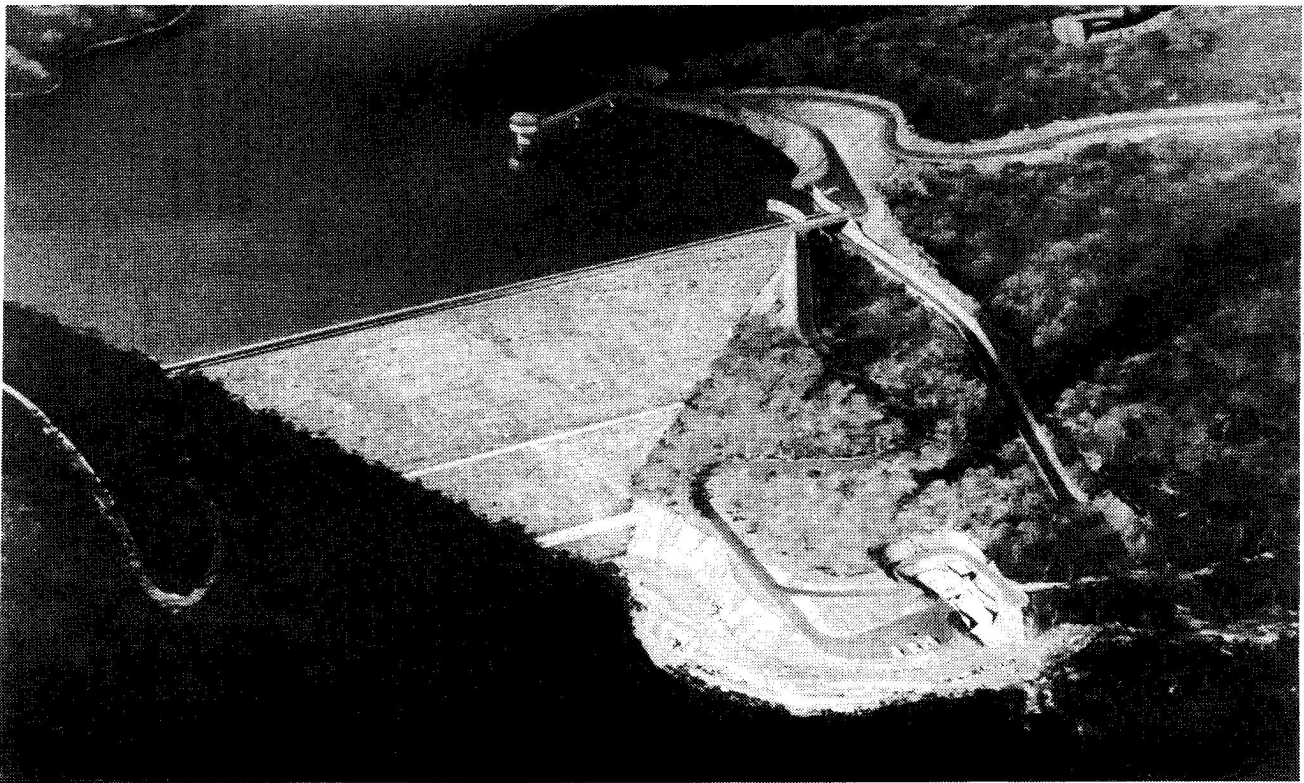


# Mangrove Creek Dam



Mangrove Creek Dam is an 80 metre high rockfill dam, with a concrete face, which stores water for the City of Gosford and Shire of Wyong. It is located approximately 50 kilometres north-west of Gosford, and provides on-stream storage of water, which is released upon demand to flow 20 kilometres downstream to the existing Mangrove Weir, from which water is pumped to Mooney and then to Gosford, via the treatment plant at Somersby.

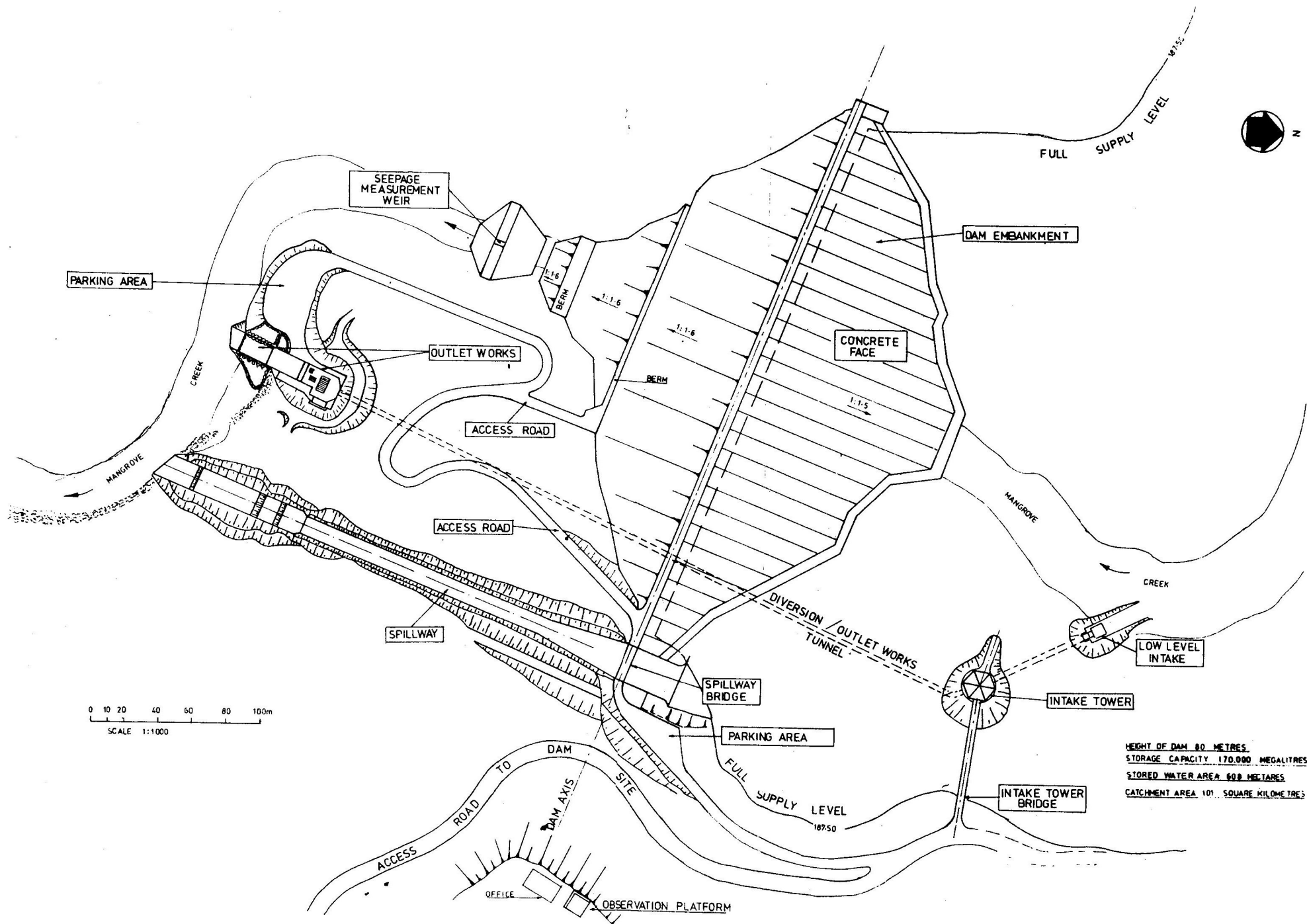
The catchment area of 10,000 hectares, or 100 square kilometres, is typical sandstone eucalypt bush and is bounded by George Downes Drive to the east, the St Albans Road to the north and the Great North Road to the west. The Dam has a crest length of 380 metres. The storage capacity of the dam is approximately 190,000 megalitres (30% of the capacity of Sydney Harbour) and the stored waters have a surface area of approximately 700 hectares. Provision has been made in the current dam design for raising the dam a further 25 metres, thereby increasing the capacity to 420,000 megalitres (approximately equal to the volume of Sydney Harbour), with a stored water area of 1,200 hectares. Construction of this stage is projected to commence in approximately 20 years time.

The suitability of various types of dam was examined in the early stages of the investigation. A concrete dam was ruled out on the basis of high costs and unsuitability of the site. Construction of an earth or clay core dam was not practical because of the insufficient quantity of suitable core material available in the locality. A rockfill type dam with an impervious membrane on the upstream face appeared to be the best solution.

After comparing asphaltic concrete and reinforced concrete faced embankments, the latter type was selected as the most suitable, since the height of structure, the need for future raising of the dam, and cost comparisons all favoured this type.

The dam is composed basically of rolled, soft rockfill, utilising the Narrabeen Group of sandstones and siltstones, of which 1.3 million cubic metres was required. This material being obtained from a quarry located within the storage area. The embankment also contains approximately 100,000 cubic metres of processed basalt obtained from quarries at Kulnura and Peats Ridge. This material was incorporated into various filters and drains within the embankment to cope with seepage within the embankment and foundations. The concrete face which tapers from 600mm at the base to 300mm thick at the crest of the dam contains approximately 13,500 cubic metres of concrete and covers an area of approximately 30,000 square metres.

The Spillway is located on the left abutment and consists of a concrete lined channel, which varies in width from 20 metres to 10 metres. The channel is approximately 300 metres long, and will be used to carry overspill water when the dam is full. During construction, Mangrove Creek was being diverted through a tunnel in the left abutment. The tunnel is approximately half a kilometre long and 2.5 metres in diameter. A 50 metre high Intake Tower, in conjunction with valves located at the downstream end of the tunnel, facilitates the release of water from the dam into Mangrove Creek to supplement dry weather flows.



HEIGHT OF DAM 80 METRES  
 STORAGE CAPACITY 170,000 MEGALITRES  
 STORED WATER AREA 600 HECTARES  
 CATCHMENT AREA 101 SQUARE KILOMETRES

**GOSFORD CITY COUNCIL**

**MANGROVE CREEK DAM**

**Data Sheet**

**Stage I**

**1. General**

|                         |                         |
|-------------------------|-------------------------|
| Type of Dam             | Concrete Faced Rockfill |
| Full Supply Level       | RL 187.5m               |
| Minimum Operating Level | RL 152.5m               |
| Maximum Flood Level     | RL 193.2m               |
| Wave Wall Level         | RL 194.5m               |
| Crest Level             | RL 193.3m               |
| Catchment Area          | 101 km <sup>2</sup>     |
| Average Annual Rainfall | 1200mm                  |
| Storage Capacity at FSL | 190,000 Ml              |
| Surface Area            | 680 Ha                  |
| Maximum Water Depth     | 65m                     |

**2. Embankment**

|   |                         |
|---|-------------------------|
| Height of Dam (from lowest general foundation level to crest) | 80m                     |
| Length of Crest   | 380m                    |
| Crest Width   | 6m                      |
| Volume of Rockfill  | 1,340,000m <sup>3</sup> |

**3. Spillway**

|                    |                      |
|--------------------|----------------------|
| Width              | 20m tapering to 10m  |
| Length             | 240m                 |
| Type               | Concrete lined chute |
| Discharge Capacity | 570m <sup>3</sup> /s |
| Energy Dissipation | Flip Bucket          |

**4. Intake Tower**

|        |   |
|--------|---|
| Height | 47m   |
| Type   | Wet Well (Selective withdrawal by in line shutter system) |

**5. Outlet Works**

|                                  |                         |
|----------------------------------|-------------------------|
| Tunnel Lining                    | Concrete and Mild Steel |
| Diameter                         | 2.5m                    |
| Length                           | 490m                    |
| Valves -                         |                         |
| Two Butterfly Valves             | 2000 and 900mm diameter |
| Two Fixed Dispersion Cone Valves | 1524 and 530mm diameter |

## 6. Spillway Bridge

|        |   |
|--------|---|
| Length | 20m   |
| Width  | 4.7m kerb to kerb                                     |
| Type   | Single span composite<br>pretensioned girders/RC deck |

## 7. Intake Tower Bridge

|        |  |
|--------|--|
| Length | 60m  |
| Width  | 3.2m kerb to kerb                          |
| Type   | Two span composite steel<br>girder/RC deck |

## Stage I - Stage II comparison

|                         | Stage I                  | Stage II                 |
|-------------------------|--------------------------|--------------------------|
| Storage Capacity at FSL | 190,000 Ml               | 455,000 Ml               |
| Maximum Water Depth     | 65 m                     | 90 m                     |
| Surface Area            | 680 Ha                   | 1,360 Ha                 |
| Embankment Height       | 80 m                     | 105 m                    |
| Crest Length            | 380 m                    | 490 m                    |
| Volume of Rockfill      | 1,340,000 m <sup>3</sup> | 2,740,000 m <sup>3</sup> |

## **LIST OF DAMS WHICH ARE EQUAL OR LARGER IN HEIGHT AND/OR CAPACITY**

### **WHEN COMPARED WITH MANGROVE CREEK DAM**

| NAME               | HEIGHT | CAPACITY<br>MEGALITRES* | AUTHORITY    |
|--------------------|--------|-------------------------|--------------|
| Jindabyne          | 72 m   | 688,287                 | S M E C      |
| Burrendong         | 76 m   | 1,188,000               | S M E C      |
| Glenbawn           | 78 m   | 360,000                 | W R C        |
| Mangrove Creek Dam | 80 m   | 190,000                 | G C C        |
| Nepean             | 81 m   | 81,400                  | M W S & D B  |
| Devils Gate        | 84 m   | 180,000                 | H E C        |
| Wyangla            | 85 m   | 1,220,000               | W R C        |
| Tumut Pond         | 86 m   | 52,793                  | S M E C      |
| Upper Yarra        | 89 m   | 207,200                 | M B of W Vic |
| Gehi               | 91 m   | 21,043                  | S M E C      |
| Blowerang          | 112 m  | 1,628,000               | S M E C      |
| Eucumbene          | 116 m  | 4,798,400               | S M E C      |
| Warragamba         | 137 m  | 2,091,800               | M W S & D B  |

\* One megalitre is one million (1,000,000) litres which is approximately two hundred thousand (200,000) gallons